McCORD

Breakthrough Technologies Set a New Standard for Burn and Wound Care

Innovative Wound Technologies That Substantially Advance Patient Care and Wound Healing Outcomes

The McCord wound care line provides a quantum leap forward in the treatment of wounds and burns. Each product is carefully researched, and the findings are important enough to garner patent protection. The two innovative ingredients are Fentonite and BioBlock. In vetro and in vivo research validates the effectiveness of the technologies.

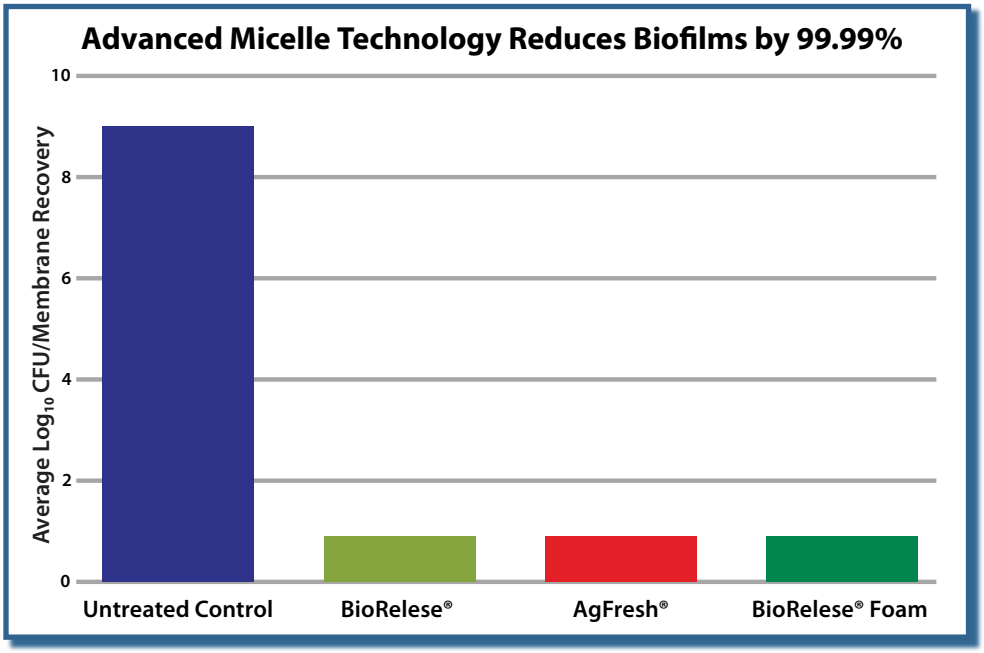
Fentonite® Blocks Infections and Biofilm Formations at the Source

Fentonite is a patent protected ingredient that provides a non-cytotoxic approach to the inhibition of wound infections and biofilm formation by blocking the activity of autoinducers. Autoinducers are first released by bacteria while they are still in their pre-infection state. Autoinducers are signaling molecules produced and released by bacteria as they grow and reach a certain cell density within the biofilm. When the concentration of autoinducers reaches a threshold level, they bind to specific receptors on bacterial cells, initiating a signaling cascade that leads to the activation of quorum sensing.

Autoinducers play a crucial role in the initiation and regulation of biofilm formation. As bacteria produce autoinducers, the increasing concentrations signal the presence of a sufficiently dense bacterial population. This, in turn, triggers the production of extracellular polymeric substances (EPS), which are responsible for the biofilm's structural integrity. Autoinducers help synchronize the timing of biofilm formation, ensuring the biofilm matures and develops collectively.

Autoinducers are at the front end of the cascade. Through a process known as quorum sensing, autoinducers continue to collect until the bacteria "senses" there are enough bacteria to release virulent factors. At this point the biofilm starts to form through the release of EPS and the infection and biofilm continue to expand until the host is overcome. Fentonite blocks the infection cascade by overwhelming the bacteria's signaling processes.

Fentonite is the only product that uses a non-cytotoxic approach to treating wound biofilms and their inherent colonization. The approach is to overwhelm the bacteria and biofilm or block its origination by infusing excessive cations and disrupting bacteria cell signaling and gene expression. The cationic minerals in Fentonite are native to the wound environment and are part of the normal healing process. Fentonite allows wounds to heal quickly without the cytotoxic overload found in traditional wound care products.



BioRelese®, AgFresh®, and BioRelese® Foam achieved average Log_{10} CFU/membrane reduction relative to untreated control. This reduction represents a 99.99% reduction of biofilm. The published standard test method for quantification of a Pseudomonas aeruginosa biofilm grown using drip flow biofilm reactor with low shear and continuous flow was used.

Killing Bacteria Using Cation Overload

There are three important mineral cations involved in bacterial communications and signaling. Cation overload, specifically an excessive concentration of certain cations like calcium (Ca2+) and magnesium (Mg2+), have various effects on quorum sensing.

Here are some known effects:

1. Disruption of Quorum Sensing: Elevated cation levels, particularly calcium ions, interfere with quorum sensing. Excessive calcium concentrations disrupt the binding of autoinducers to their respective receptors, preventing the activation of quorum sensing pathways.

2. Inhibition of Autoinducer Production: Cation overload, including high calcium, iron and magnesium levels, inhibit the production of autoinducers by bacteria. This hinders the communication between bacterial cells and disrupts the signaling required for quorum sensing.

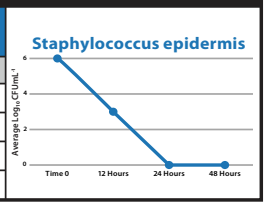
3. Altered Gene Expression: Cation overload leads to changes in gene expression patterns related to quorum sensing. Increased calcium, iron and magnesium modulate the expression of genes involved in the synthesis and reception of autoinducers, affecting the overall quorum sensing response.

4. Biofilm Disruption: High cation concentrations destabilize biofilms. Disruption of the biofilm matrix, mediated by cation overload impacts quorum sensing by dispersing the bacterial population and reducing cell-to-cell communication.

Fentonite® Effectiveness Against Common Wound Pathogens

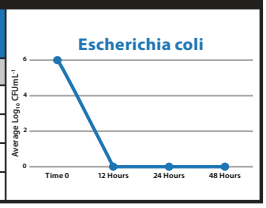
Staphylococcus epidermidis ATCC 35984

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	5.8x106	N/A	N/A	N/A
Time 12 hours	N/A	4.1x103	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%



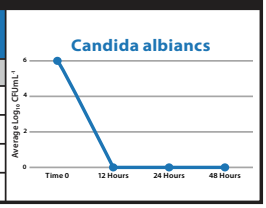
Escherichia coli ATCC 25922

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	7.7x106	N/A	N/A	N/A
Time 12 hours	N/A	<10	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%



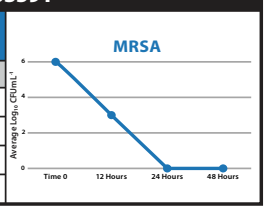
Candida albicans ATCC 90028

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	5.9x106	N/A	N/A	N/A
Time 12 hours	N/A	<10	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%



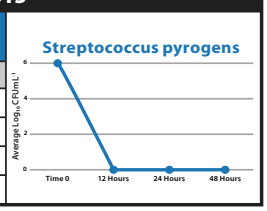
MRSA (Staphylococcus aureus) ATCC 33591

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	6.3x106	N/A	N/A	N/A
Time 12 hours	N/A	3.0x103	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%



Streptococcus pyrogenes ATCC 19615

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	4.7x106	N/A	N/A	N/A
Time 12 hours	N/A	<10	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%

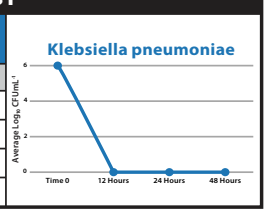


Pseudomonas aeruginosa 9027

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	5.6x106	N/A	N/A	N/A
Time 12 hours	N/A	<10	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%

Klebsiella pneumoniae ATCC 10031

Exposure Time	Concentration of Organism cfu/mL		Percent Reduction	
	Control	Product	Control	Product
Time 0	7.3x106	N/A	N/A	N/A
Time 12 hours	N/A	<10	N/A	99.9%
Time 24 hours	N/A	<10	N/A	99.9%
Time 48 Hours	N/A	<10	N/A	99.9%



BioBlock™

BioBlock is a combination of 3 polymers that encapsulate Octenidine to improve its antimicrobial activity within biofilm structures. Each of the three polymers have a designated purpose and provide a holistic approach to biofilm and pathogen removal. The polymer micelles time release Octenidine into the biofilm and pathogens within the biofilm.

Polymer Micelles Negatively Affect Biofilms:

Polymer micelles, that are aggregates of amphiphilic molecules, play a role in affecting biofilms in several ways. Biofilms are structured communities of microorganisms that are embedded in a self-produced matrix, and they form on various surfaces.

One of the BioBlock non-ionic polymers blocks the anchoring of biofilm to the wound and thus inhibits the biofilm from spreading. Another of the polymers uses its surfactantcy to dissolve the biofilm structures and increase permeability. The final polymer is an effective drug carrier. It serves as a "Trojan Horse" carrying Octenidine, an innovative antiseptic, that releases deep into the bacterial wall where the bacteria defenses are not in play.

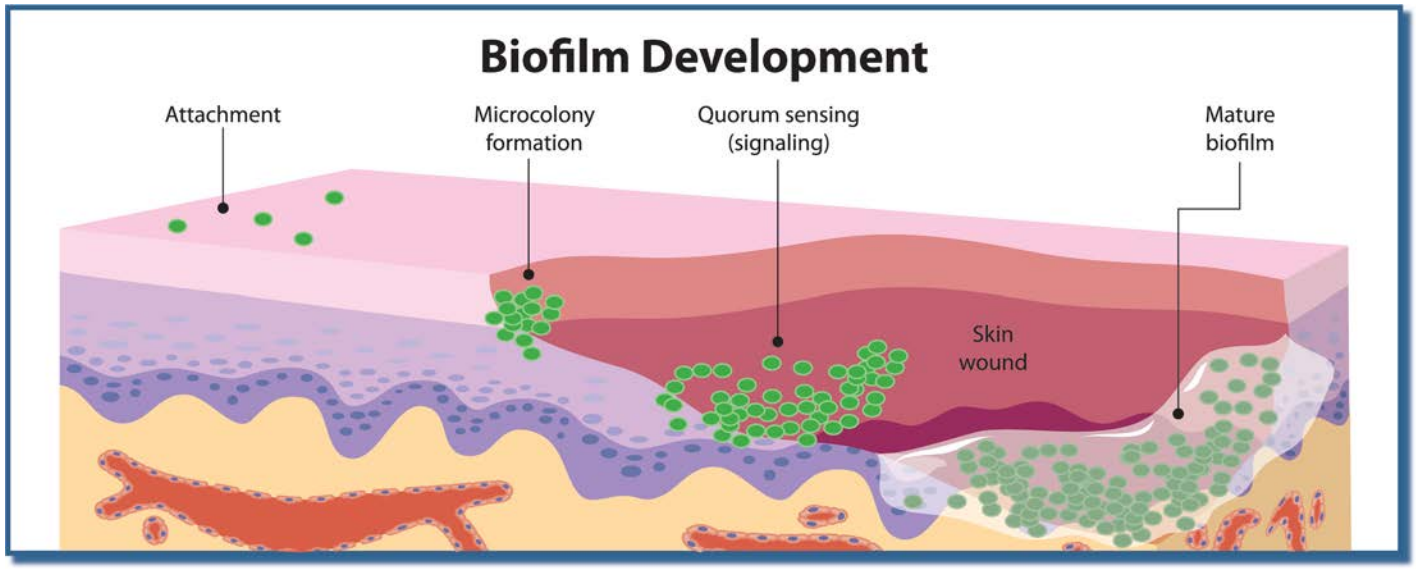
BioBlock's polymer micelles disrupt the structural integrity of biofilms. The amphiphilic nature of the polymer micelles allows them to interact with both hydrophobic and hydrophilic components of the biofilm matrix. By inserting themselves into the biofilm matrix, BioBlock's micelles can disrupt the cohesive forces holding the biofilm together, leading to the dispersion or detachment of biofilm organisms.

Here are some known effects:

1. Enhanced antimicrobial activity: Polymer micelles enhance the antimicrobial activity against biofilms. Polymer micelles encapsulate or solubilize Octenidine which is otherwise less effective against biofilms due to the protective matrix. The presence of polymer micelles improve the solubility, stability, and delivery of Octenidine to the biofilm, increasing its efficacy in killing or inhibiting the growth of microorganisms within the biofilm.

2. Increased bioavailability of Octenidine: Polymer micelles improve the bioavailability of Octenidine within the biofilm matrix. The unique structure of polymer micelles allows them to penetrate the biofilm and transport the encapsulated Octenidine to the microorganisms residing deep within the biofilm layers. This enhanced penetration overcomes the limited diffusion of Octenidine through the biofilm matrix, making the ingredient more accessible to target the biofilm-associated microorganisms.

3. Enhanced surface cleaning: Polymer micelles aid in the removal of biofilms from surfaces. Polymer micelles interact with both the biofilm matrix and the surface to which the biofilm adheres. Their surfactant properties reduce the surface tension and promote the detachment of biofilm organisms from the surface. This facilitates the cleaning process and helps in the removal of biofilm remnants.



Octenidine

All McCord wound care products use Octenidine as a primary antimicrobial. Octenidine is a cationic bispyridinamine antimicrobial agent. It shares this category with Chlorhexidine. These antiseptics are the only two bispyridinamine antimicrobial agents in the wound care space. Chlorhexidine has been the gold stand for years. Octenidine, as the newest entrant in the space, brings the safety profile of Chlorhexidine coupled with some important new advantages. Octenidine is known for its broad-spectrum antimicrobial activity against various bacteria, fungi, and enveloped viruses. Importantly, unlike Chlorhexidine, it has proven to be effective against wound biofilms. This is a huge advantage, and it allows Octenidine-based products to resolve wounds more efficiently.

The cationic nature of Octenidine allows it to interact with negatively charged components of microbial cells, including the cell membrane. Its mechanism of action involves several modes:

Here are some known effects:

1. Membrane disruption: Octenidine binds to the negatively charged bacterial membrane through electrostatic interactions. This binding leads to the disruption of the lipid bilayer, causing leakage of cellular contents and compromising membrane integrity. It disrupts the microbial cell's structural and functional integrity, leading to cell death.

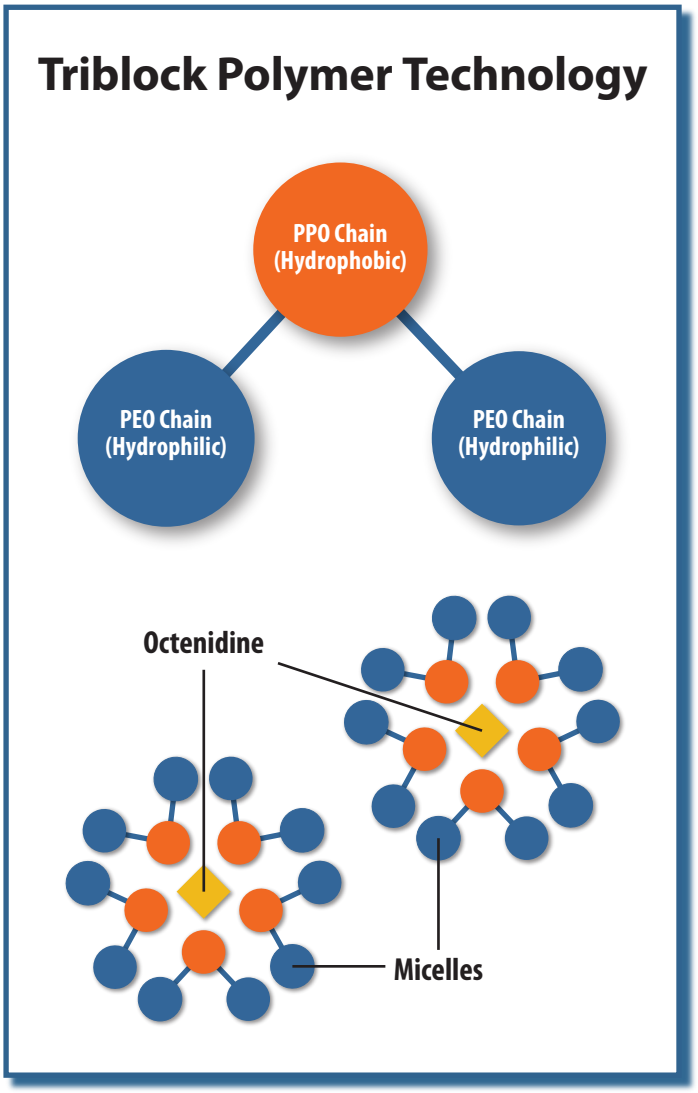
2. Disruption of biofilm: Octenidine has shown efficacy in disrupting biofilms, which are complex communities of microorganisms embedded within a self-produced matrix. It penetrates the biofilm matrix, interacting with the biofilm components, and destabilize the biofilm structure, making it more susceptible to removal and antimicrobial treatment.

3. Disruption of cellular processes: Octenidine interferes with essential cellular processes within microorganisms. It inhibits ATP synthesis, interferes with DNA and RNA synthesis, disrupts protein synthesis, and impairs enzymatic activities. These disruptions further contribute to the antimicrobial activity of Octenidine.

4. Reduced Skin Irritation: Chlorhexidine has been associated with a higher potential for skin irritation, especially in some individuals with sensitivities or prolonged use. Octenidine is generally considered to have a lower irritation potential and is often recommended as an alternative in cases where Chlorhexidine causes adverse reactions.

5. Pathogen resistance: Both Chlorhexidine and Octenidine have shown a lower likelihood of inducing microbial resistance compared to traditional antibiotics.

Octenidine acts by disrupting the cell membranes of microorganisms, leading to their destruction. The broad-spectrum antimicrobial activity makes it a valuable tool in preventing the spread of infections. One of the advantages of Octenidine is that it is less toxic to mammalian cells compared to other antiseptic agents. While it is effective against pathogens, it has been found to be less damaging to human cells, including fibroblasts, which are important cells involved in wound healing.



Thermo-Reversible Characteristics

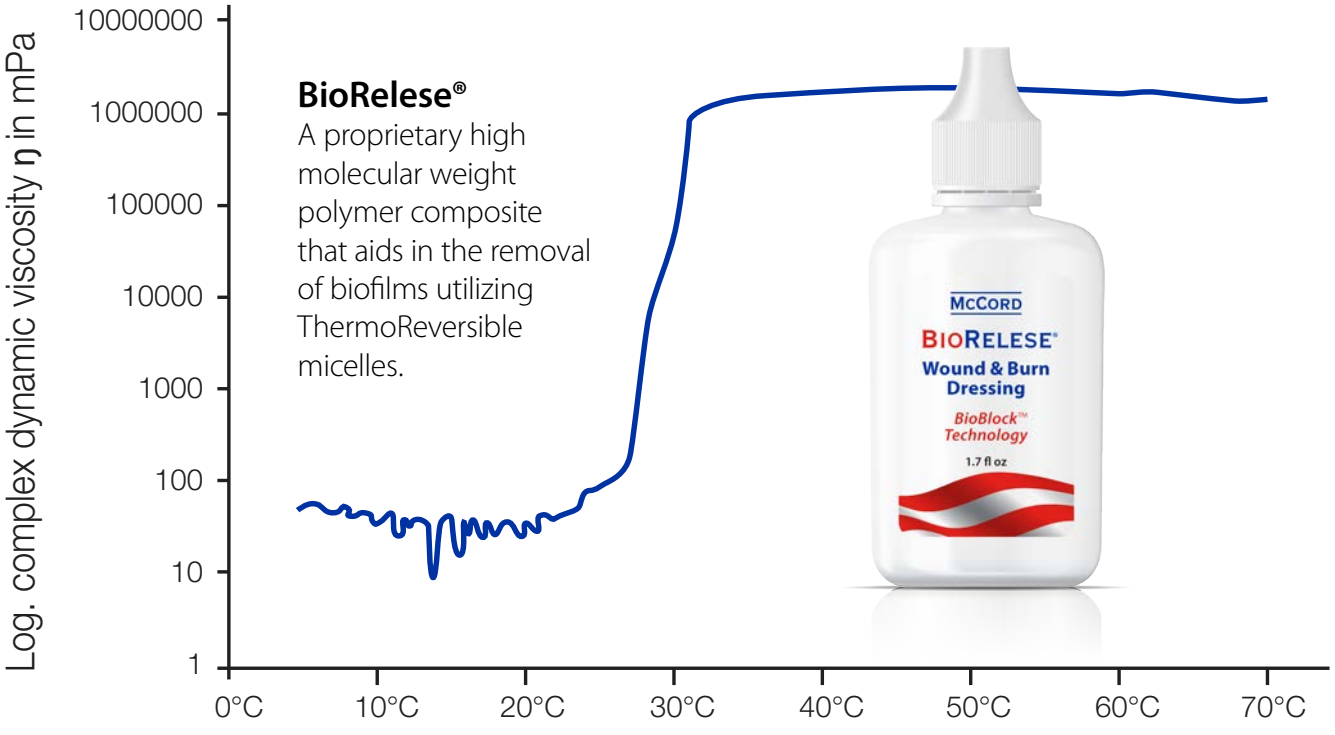
For a hydrogel to be effective at removing biofilms, the molecular weight of the polymers must exceed 12,000 g/mol. BioRelese® is the only hydrogel that meets this threshold with a molecular weight exceeding 14,000 g/mol. The competing biofilm product has a molecular weight with just over 8,000 g/mol and is therefore incapable of removing biofilm.

The product's Thermo-Reversibility changes the viscosity of the hydrogel at body temperature. The hydrogel is water thin in the bottle. Once the hydrogel is dispensed into the wound, it quickly becomes a thick, stretchable and moldable hydrogel that form-fits the wound and fills in tunnels that would otherwise have to be packed This proprietary technology saves time, money and ensures a perfect form-fitting wound bed moisture system. BioRelese® forms millions of micelles that contain a unique preservative system and a time-released antimicrobial that travels deep into the biofilm.

The high molecular weight polymers dissolve all the biofilm accounting for a 9999% removal rate. The antimicrobial system then kills the entrapped pathogens over a 24-hour period and continues to work for up to 5 days. The distribution of the antimicrobial throughout the millions of micelles creates a large surface area over which the antimicrobial activity can act, which provides long-term protection against any new microbial release within the wound Unlike the other hydrogels that are supposed to remove biofilms, there is no mechanical debridement or rubbing required.

The product does all the work and thereby preserving the newly forming cells in the wound bed. The form fitting characteristic create a perfect environment for moist wound healing without the risk of further contamination. BioRelese's high molecular weight hydrogel is non-ionic and non-cytotoxic. It gently dissolves biofilms without the use of harsh chemicals. The hydrogel not only dissolves the wound's existing biofilm, but one of the polymers inhibits the formation of biofilms completely.

THERMOREVERSIBLE: FROM WATER-THIN TO A THICK HYDROGEL



Fentonite Remineralizes the Wound Bed and Plays a Critical Role in Wound Closure

Fentonite is the perfect balance of minerals that revitalize wound tissue. Without key minerals wounds are slow to heal or the become long-term chronic wounds. Minerals play a critical role in various physiological processes, including wound healing.

1. Magnesium (Mg)

• *Collagen Production:* Magnesium is involved in the synthesis of collagen, a primary protein in the wound matrix. Collagen provides structural support and is vital for the strength and flexibility of healing tissues.

• *Enzyme Activation:* Magnesium acts as a cofactor for several enzymes essential for the wound healing process. This includes enzymes involved in DNA replication, protein synthesis, and cell proliferation.

• *Inflammation Regulation:* Proper magnesium levels may modulate local inflammation at the wound site. This is important because while inflammation is necessary for wound healing, excessive or prolonged inflammation can be detrimental.

2. Calcium (Ca)

• *Cell Proliferation and Migration:* Calcium plays a role in the activation of keratinocytes (a type of skin cell) which are essential for re-epithelialization, a critical phase where the wound is covered with new skin cells.

• *Clot Formation:* Upon injury, calcium contributes to the coagulation cascade, which results in the formation of a fibrin clot. This clot acts as a temporary barrier and scaffold for the healing tissue.

• *Signal Transduction:* Calcium ions play a role in various cell signaling pathways that are crucial for wound healing, including pathways that regulate cell migration and proliferation.

3. Iron (Fe)

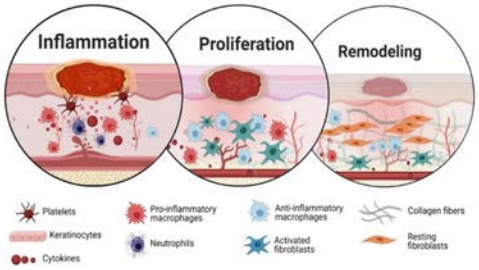
• *Oxygen Transport:* Hemoglobin, which requires iron for its structure, is responsible for oxygen transport in the blood. Oxygen is essential for cellular respiration and energy production, particularly in rapidly dividing cells involved in wound healing.

• *Collagen Synthesis:* Iron is a cofactor for prolyl hydroxylase, an enzyme that stabilizes the collagen triple helix structure.

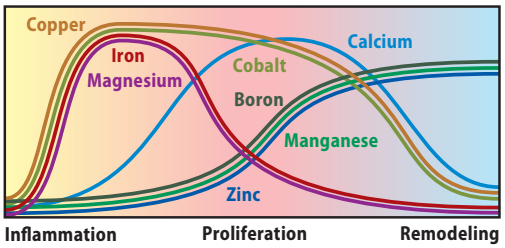
• *Immune Response:* Iron is critical for the optimal function of immune cells. Neutrophils and macrophages, two types of immune cells that play a role in wound cleaning and preparation for healing, rely on iron for various biochemical processes.

• *Mitochondrial Function:* Many enzymes in the electron transport chain, which is responsible for cellular ATP production, require iron. Sufficient energy is essential for cell proliferation and other healing processes.

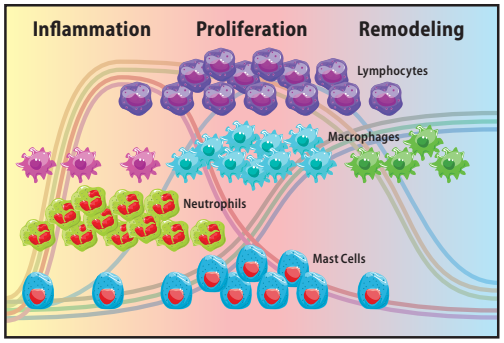
WOUND HEALING PHASES



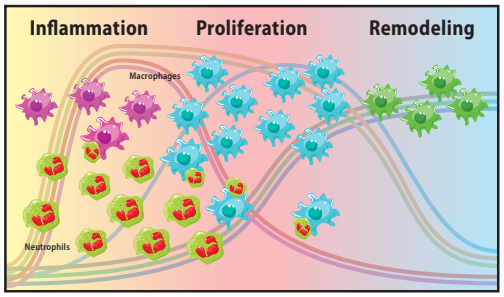
FENTONITE® NANOPARTICLE MINERALS



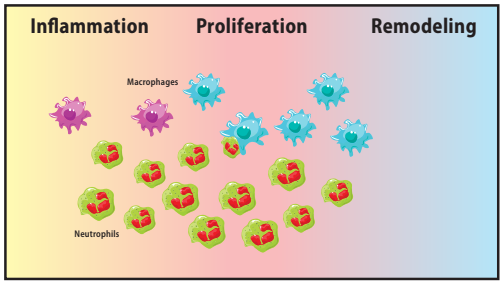
IMMUNE CELL PHASES



PRIMARY INTENTION HEALING



CHRONIC WOUND HEALING



McCord

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PRODUCT INFORMATION

PART NUMBER	NAME	SIZE	DESCRIPTION	CASE UPC	CARTON UPC	CARTON QTY	CASE QTY
MCR71359	AgFresh®	30mL	Silver Wound and Burn Dressing	754684518572	614409567967	5 EA	5 CARTON
MCR71360	BioRelese®	1.7oz	Wound and Burn Dressing	754684518565	614409567882	1 EA	24 CARTON
MCR71361	BioRelese® Foamer	5oz	Sprayable Wound and Burn Dressing	754684518558	754684518541	1 EA	12 CARTON